

Patent claims

1. A data capturing and processing system (1) for a roller bearing in which at least one sensor element (19), strip conductors (4) and electronic components (5, 6) are arranged adjacent a flexible carrier material (2), characterized in that the sensor element (19), the strip conductors (4) and the electronic components (5, 6) are directly connected to the flexible carrier material (2).

~~2. The data capturing and processing system as claimed in~~
claim 1, characterized in that the sensor element (19) is fastened on the underside, and the strip conductors (4) and the electronic components (5) are fastened on the upper side of the flexible carrier material (2).

3. The data capturing and processing system as claimed in claim 1, characterized in that the strip conductors (4) and the electronic components (5) are fastened on the underside and the sensor element (19) is fastened on the upper side of the carrier material (2).

4. The data capturing and processing system as claimed in claim 1, characterized in that the sensor element (19) is at least one strain gage (3).

5. The data capturing and processing system as claimed in claim 1, characterized in that the sensor element (19) is a

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capacitor (16) with at least two plate-like conductor areas (17, 18) which are opposite one another and thereby separated from one another by the flexible carrier material (2), the carrier material (2) being a dielectric between the conductor areas (17, 18).

6. The data capturing and processing system as claimed in claim 5, characterized in that at least one of the conductor areas (18) on one side of the carrier material (2) can be at least partially elastically deformed in the direction of the opposite conductor areas (17) on the opposite side of the carrier material (2).

7. The data capturing and processing system as claimed in claim 1, characterized in that the sensor element (19) is at least one at least partially elastically extensible resistance bridge with at least one conductor of copper.

8. The data capturing and processing system as claimed in claim 1, 2, 3, 4, 5, 6 or 7, characterized in that the sensor element (19) is connected by signaling technology via contacting elements (13) to the strip conductors (4), the contacting elements (13) being formed in the flexible carrier material (2) and aligned perpendicularly in relation to the longitudinal and transverse extents of said carrier material or arranged in the manner of surface areas.

9. The data capturing and processing system as claimed in at least one of the preceding claims, characterized in that the sensor element (19) is fastened on that side of the flexible carrier material (2) which in the assembled state faces the surface of that roller bearing component (9) on which the measurement data capturing and processing system (1) is arranged.

10. The data capturing and processing system as claimed in ~~at least one of the preceding claims, characterized in that~~
~~the sensor element (19) is fastened on that side of the~~
flexible carrier material (2) which in the assembled state faces the surface of that roller bearing component (9) on which the measurement data capturing and processing system (1) is fixed by means of adhesive material (10).

11. The data capturing and processing system as claimed in at least one of the preceding claims, characterized in that the flexible carrier material (2) comprises a film or a number of films lying one on top of the other.

12. The data capturing and processing system as claimed in claim 1, characterized in that the flexible carrier material (2) consists of a plastic or a thin and flexible metal foil.

13. The data capturing and processing system as claimed in claim 12, characterized in that the plastic is a polyimide.

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14. The data capturing and processing system as claimed in claim 1, characterized in that the flexible carrier material (2) is of ceramic.

15. The data capturing and processing system as claimed in at least one of the preceding claims, characterized in that the sensor element (19), the strip conductors (4) and the electronic components (5, 6) are formed on the flexible carrier material (2) by means of a screen printing process, by vapor deposition or deposition of insulating, conducting and/or semiconducting materials.

16. The data capturing and processing system as claimed in at least one of the preceding claims, characterized in that the sensor element (19), the strip conductors (4) and/or the electronic components (5) are respectively formed on separate flexible carrier materials, which are connected to one another to form a common flexible carrier material (2).

17. The data capturing and processing system as claimed in at least one of the preceding claims, characterized in that at least one of the electronic components (5) is an amplifier (20).

18. The data capturing and processing system as claimed in at least one of the preceding claims, characterized in that the flexible carrier material (2) has a greater mechanical rigidity, at least in the region of the amplifier (20).

19. The data capturing and processing system as claimed in at least one of the preceding claims, characterized in that the sensor element (19) is adhesively attached on the flexible carrier material (2).

20. The data capturing and processing system as claimed in at least one of the preceding claims, characterized in that an adhesive material (10) is applied to the flexible carrier material (2) for fastening the sensor element (19) and is covered with a pull-off protective film before the sensor element (19) is attached.

21. The data capturing and processing system as claimed in at least one of the preceding claims, characterized in that the surface of the sensor element (19) and of the strip conductors (4) is covered with an electrically insulating layer (8).

22. The data capturing and processing system as claimed in at least one of the preceding claims, characterized in that the surface of the sensor element (19) and of the strip conductors (4) is covered with an electrically insulating layer (8) and in that the insulating layer (8) is a solder resist.

23. The data capturing and processing system as claimed in at least one of the preceding claims, characterized in that the surface of the sensor element (19) and of the strip

conductors (4) is covered with an electrically insulating layer (8) and in that the insulating layer (8) is an adhesive material (10), the adhesive material (10) being applied to that side of the flexible carrier material (2) which in the assembled state faces the surface of that roller bearing component (9) on which the measurement data capturing and processing system (1) is fixed by means of the adhesive material (10).

24. The data capturing and processing system as claimed in ~~at least one of the preceding claims, characterized in that~~ the electrical and electronic components as well as the insulating layers and the flexible carrier material (2) and also the sensor element (19) at least partially consist of or are constructed from electrically insulating, semiconducting and/or conducting polymers.

25. A roller bearing with a data capturing and processing system as claimed in at least one of the preceding claims, characterized in that the data capturing and processing system (1) is fastened in at least one recess or a peripheral groove (12), or on a groove-less or recess-less annular area, of at least one roller bearing component (9), the roller bearing component (9) and at least one further roller bearing component enclosing rolling bodies between them.

26. The roller bearing with a data capturing and processing system as claimed in at least one of the preceding claims, characterized in that the data capturing and processing system (1) is fastened in at least one recess or a peripheral groove (12), or on a groove-less or recess-less annular area, at least on the outer side of a bearing outer ring (9).

27. The roller bearing with a data capturing and processing system as claimed in at least one of the preceding claims, characterized in that the data capturing and processing system (1) is covered with an insulating encapsulating material (11).